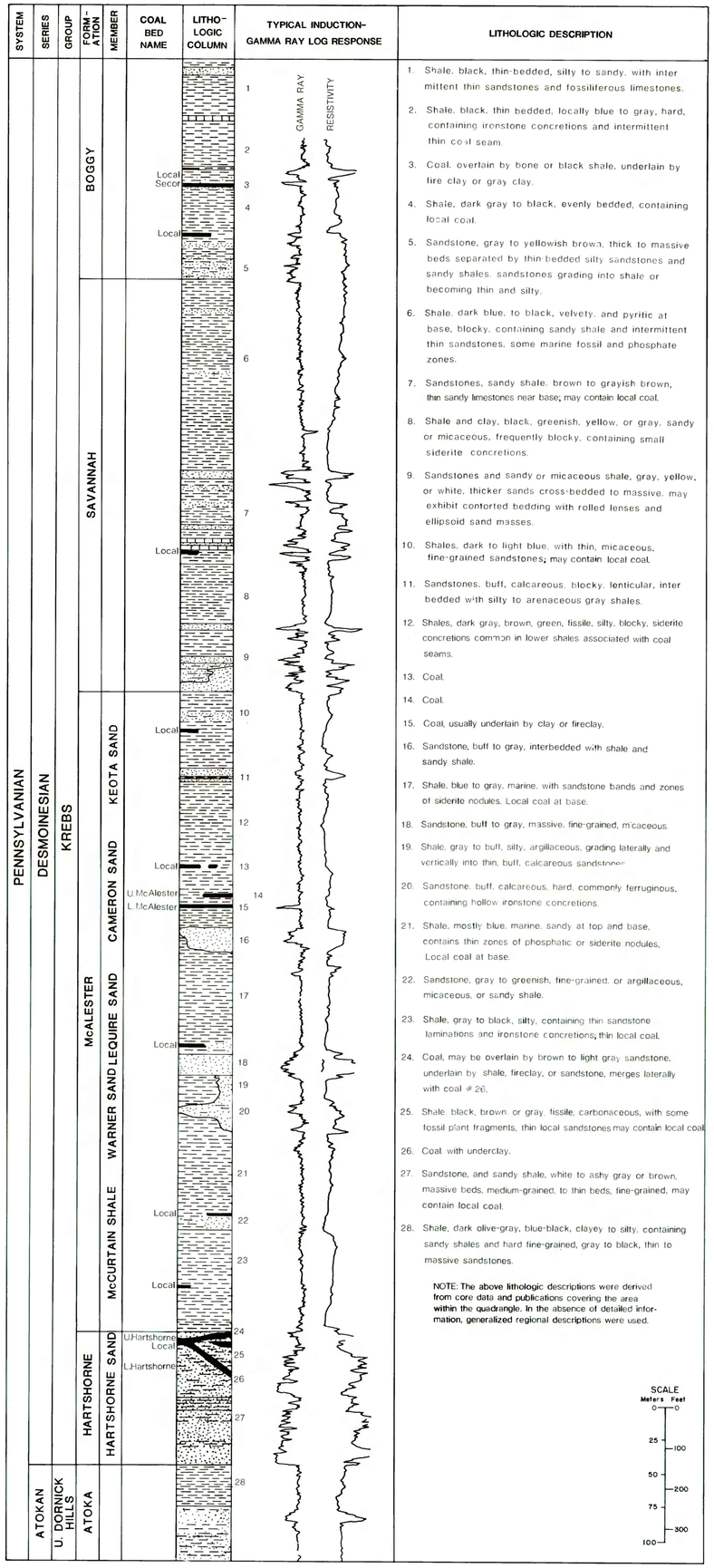
COMPOSITE COLUMNAR SECTION

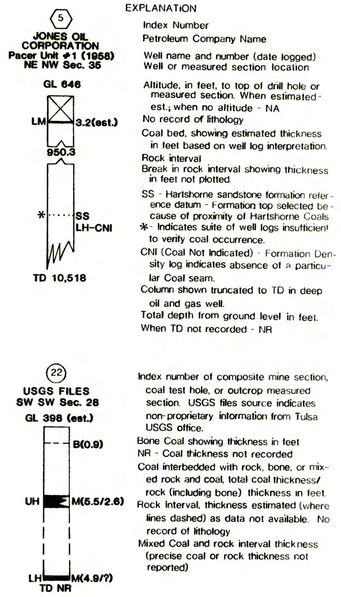


LITHOLOGIC DESCRIPTION

1. Shale, black, thin-bedded, silty to sandy, with intermittent thin sandstones and fossiliferous limestones.
2. Shale, black, thin bedded, locally blue to gray, hard, containing ironstone concretions and intermittent thin coal seam.
3. Coal, overlain by bone or black shale, underlain by fire clay or gray clay.
4. Shale, dark gray to black, evenly bedded, containing local coal.
5. Sandstone, gray to yellowish brown, thick to massive beds separated by thin-bedded silty sandstones and sandy shales, sandstones grading into shale or becoming thin and silty.
6. Shale, dark blue, to black, velvety, and pyritic at base, blocky, containing sandy shale and intermittent thin sandstones, some marine fossil and phosphate zones.
7. Sandstones, sandy shale, brown to grayish brown, thin sandy limestones near base; may contain local coal.
8. Shale and clay, black, greenish, yellow, or gray, sandy or micaceous, frequently blocky, containing small siderite concretions.
9. Sandstones and sandy or micaceous shale, gray, yellow, or white, thicker sands cross-bedded to massive, may exhibit contorted bedding with rolled lenses and ellipsoid sand masses.
10. Shales, dark to light blue, with thin, micaceous, fine-grained sandstones; may contain local coal.
11. Sandstones, buff, calcareous, blocky, lenticular, interbedded with silty to arenaceous gray shales.
12. Shales, dark gray, brown, green, fissile, silty, blocky, siderite concretions common in lower shales associated with coal seams.
13. Coal.
14. Coal.
15. Coal, usually underlain by clay or fireclay.
16. Sandstone, buff to gray, interbedded with shale and sandy shale.
17. Shale, blue to gray, marine, with sandstone bands and zones of siderite nodules. Local coal at base.
18. Sandstone, buff to gray, massive, fine-grained, micaceous.
19. Shale, gray to buff, silty, argillaceous, grading laterally and vertically into thin, buff, calcareous sandstones.
20. Sandstone, buff, calcareous, hard, commonly ferruginous, containing hollow ironstone concretions.
21. Shale, mostly blue, marine, sandy at top and base, contains thin zones of phosphatic or siderite nodules, Local coal at base.
22. Sandstone, gray to greenish, fine-grained, or argillaceous, micaceous, or sandy shale.
23. Shale, gray to black, silty, containing thin sandstone laminations and ironstone concretions; thin local coal.
24. Coal, may be overlain by brown to light gray sandstone, underlain by shale, fireclay, or sandstone, merges laterally with coal #26.
25. Shale, black, brown or gray, fissile, carbonaceous, with some fossil plant fragments, thin local sandstones may contain local coal.
26. Coal with underclay.
27. Sandstone, and sandy shale, white to ashy gray or brown, massive beds, medium-grained, to thin beds, fine-grained, may contain local coal.
28. Shale, dark olive-gray, blue-black, clayey to silty, containing sandy shales and hard fine-grained, gray to black, thin to massive sandstones.

NOTE: The above lithologic descriptions were derived from core data and publications covering the area within the quadrangle. In the absence of detailed information, generalized regional descriptions were used.

SCALE
Meters 0 25 50 75 100
Feet 0 100 200 300



EXPLANATION

Index Number
Petroleum Company Name
Well name and number (date logged)
Well or measured section location
Altitude, in feet, to top of drill hole or measured section. When estimated - est, when no altitude - NA
No record of lithology
Coal bed, showing estimated thickness in feet based on well log interpretation.
Rock interval
Break in rock interval showing thickness in feet not plotted.
SS - Hartshorne sandstone formation reference datum - Formation top selected because of proximity of Hartshorne Coals.
* - Indicates suite of well logs insufficient to verify coal occurrence.
CNI (Coal Not Indicated) - Formation Density log indicates absence of a particular Coal seam.
Column shown truncated to TD in deep oil and gas well.
Total depth from ground level in feet.
When TD not recorded - NR

Index number of composite mine section, coal test hole, or outcrop measured section. USGS files source indicates non-proprietary information from Tulsa USGS office.
Bone Coal showing thickness in feet
NR - Coal thickness not recorded
Coal interbedded with rock, bone, or mixed rock and coal, total coal thickness/rock (including bone) thickness in feet.
Rock interval, thickness estimated (where lines dashed) as data not available. No record of lithology
Mixed Coal and rock interval thickness (precise coal or rock thickness not reported)

Column left open at ends when measured section continues into rock units
NOTE: Thickness reported to tenths of feet only when resolution of data permitted

L Local (unnamed) coal bed
SE Secor Coal
UM Upper McAlester Coal
LM Lower McAlester (Stigler) Coal
UH Upper Hartshorne Coal
LH Lower Hartshorne Coal
H Hartshorne Coal

COAL BED SYMBOLS AND NAMES

NOTE: The explanation has been compiled to depict all possible combinations of data and does not intentionally represent any particular data points.

CORRELATION OF COAL BEDS IN WELL LOGS

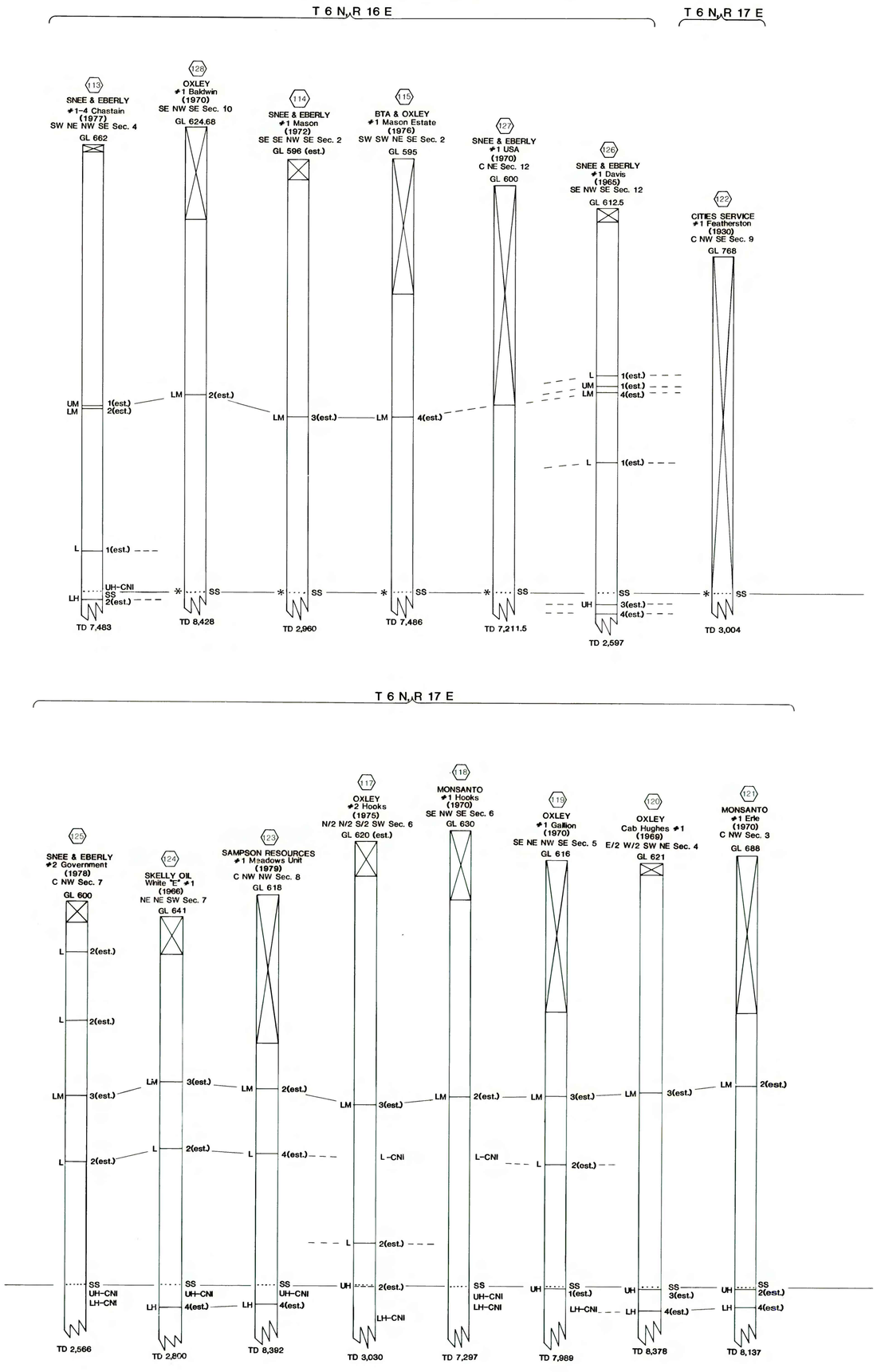


PLATE 3
COAL DATA SHEET
SHEET 1 OF 4

FEDERAL COAL RESOURCE OCCURRENCE MAP OF THE BLOCKER 7.5-MINUTE QUADRANGLE, PITTSBURG AND LATIMER COUNTIES, OKLAHOMA

BY GEOLOGICAL SERVICES OF TULSA, INC., B. T. BRADY, USGS, AND J. L. QUERRY, BLM

This report was prepared under contract to the U.S. Geological Survey, and has not been edited for conformity with Geological Survey editorial standards or stratigraphic nomenclature. Opinions expressed herein do not necessarily represent those of the Geological Survey.

COMPILED IN 1980
This map intended for land-use planning purposes only

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